

Martin Blomberg, designer extraordinaire

His EMD locomotive truck design has held up for half a century

BY MAX EPHRAIM JR.

ANY FOLLOWER OF the diesel locomotive knows that the units of General Motors' Electro-Motive Division ride on what is known as the "Blomberg truck," or a derivative of it. But who or what was Blomberg?

The man was Martin Blomberg, designer extraordinaire.

There was little in his boyhood years to indicate he would someday design a locomotive truck, or wheel/motor assembly, which is still in use after a half century, a rarely equaled feat of longevity. Born Martin Petrus Fredrik Blomberg in Osterval, Sweden, on December 11, 1888, he was the second of three children. His father was a strict school-teacher/minister who raised his family with rigid discipline. Martin graduated from the Technical Institute in Orebro, Sweden, in 1910 and attended the University at Uppsala, Sweden.

In his younger years, Martin trained three hours every day in gymnastics and could chin himself using one finger. He was an expert on the flying rings, side horse, high jump, and pole vault. He was a leading gymnast and track man in Sweden and was scheduled to represent his country in the 1912 Olympics. Instead, he emigrated to Canada.

From 1912 to 1914, he worked in a paper factory in Trois-Rivieres, Quebec, but had to quit when he contracted typhoid fever. He had five relapses, partly due to his reluctance to rest. During his years in Canada he studied drafting and mechanical engineering at night school, and he learned well the principles of stress and strain.

After a stint in 1915 with National Steel Car Corp. in Hamilton, Ontario, in 1916 he traveled alone with canoe and pack-sack on a 1000-mile trip down the Albany River toward Hudson Bay. He had many harsh



After World War I, Blomberg joined Pullman Company.

experiences, but the high point was his discovery of some high-grade gold ore.

Blomberg moved to the United States in 1916 and served in the U.S. Army in World War I. After his discharge, he married Laura Van Buskirk. Their son, Richard Nelson Blomberg, was born on October 21, 1924.

Blomberg and the FT

From 1925 to 1935, Martin Blomberg worked for the Pullman Company. His hard work and strong design capabilities were soon recognized, and he was placed in charge of carbody and truck design. In the 1930's, he was deeply involved with the

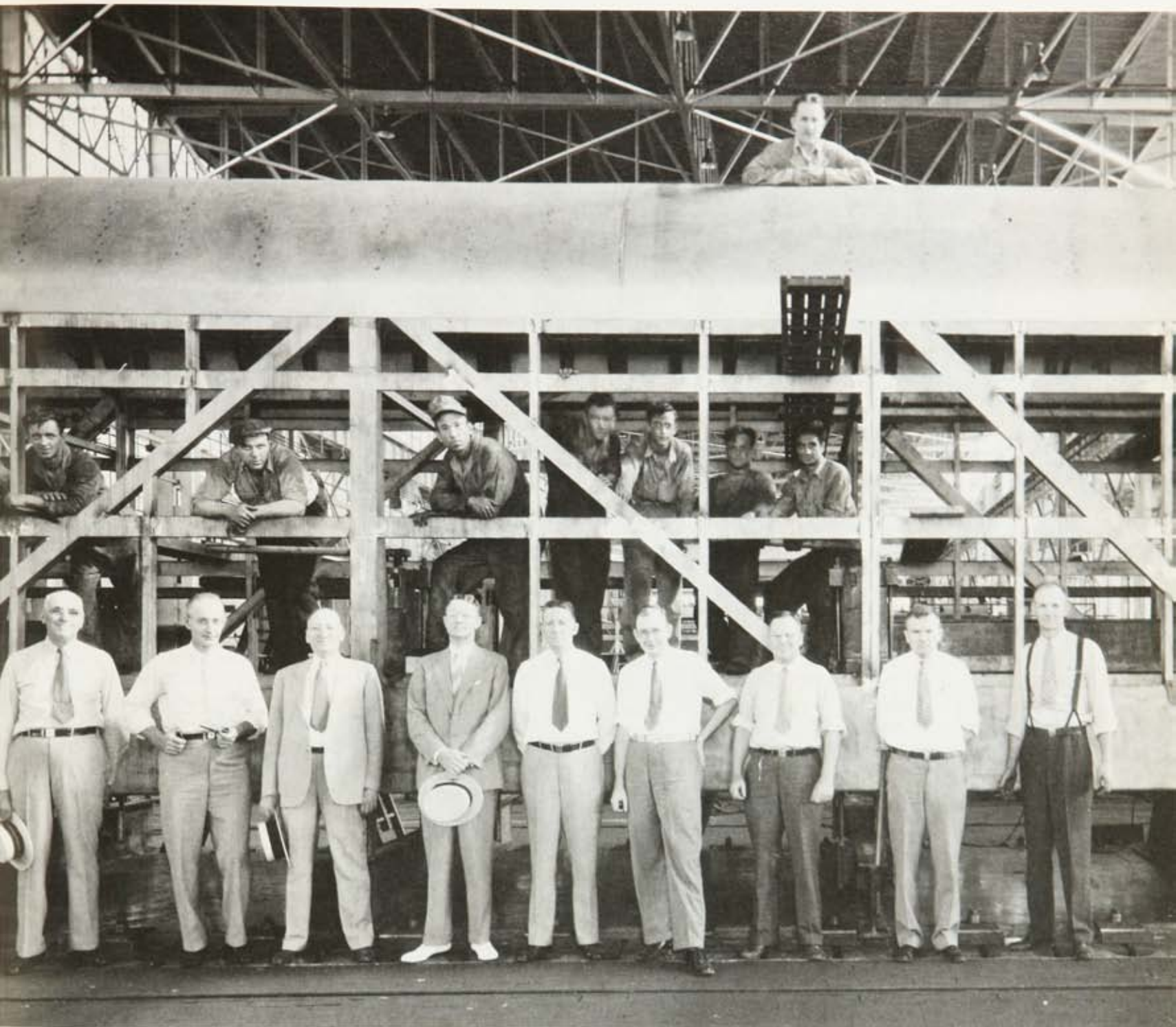
design of new lightweight "Streamliner" passenger trains. His last assignment at Pullman was the design of the *Denver Zephyr*. During his years at Pullman he was granted several patents, including those on rubber draft gear, a development he pioneered.

On September 1, 1935, Blomberg joined Electro-Motive Corporation, by then five years a General Motors subsidiary, in Chicago. (EMC would become the Electro-Motive Division of GM effective January 1, 1941.) He was immediately put in charge of, yes, carbody and truck design. He moved his family into a new home in suburban Hinsdale, where he would reside until his retirement 14 years later.

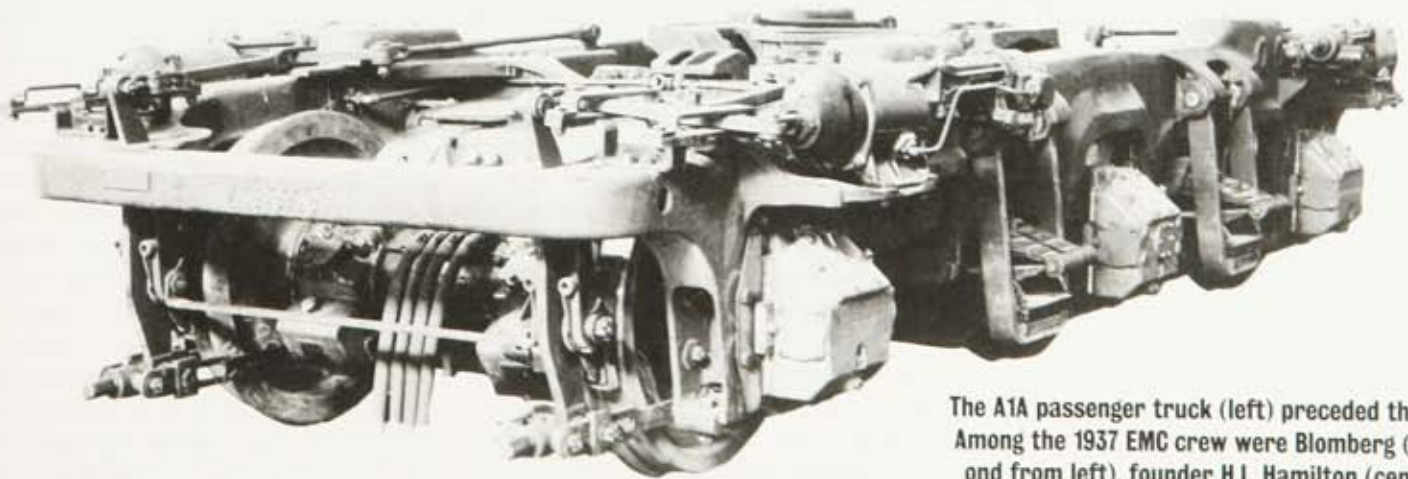
Martin worked closely with General Steel Castings on the A1A truck (three axles, the outer two powered) for the new "Streamliner" passenger-train diesel locomotives. He had a strong intuitive feeling about truck design and is well remembered as the man who promoted the outside swing hanger to provide lateral stability and excellent ride characteristics. His greatest challenge, though, was ahead—a

brand-new, four-wheel truck to be used on the first production model FT locomotive destined for mainline freight service. The FT, a four-unit set numbered EMC 103, barnstormed 83,764 miles on 20 railroads in 35 states in 1939-40, impressing railroaders everywhere. It was tagged by TRAINS Editor David P. Morgan, in a landmark February 1960 story, as "The Diesel That Did It"—i.e., killed the steam locomotive. Blomberg's "F" truck, with outside swing hangers, journal-box coil springs, and elliptic bolster springing, was a design that met the challenge.

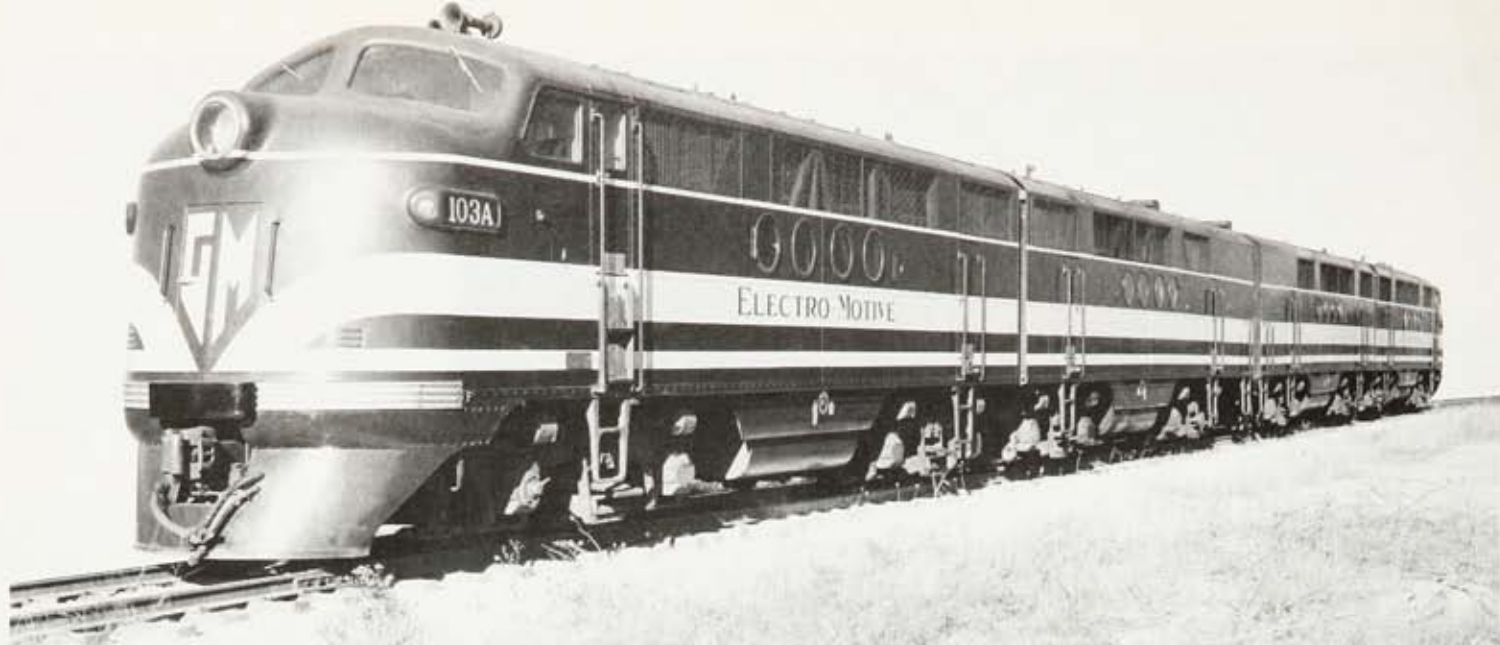
This same basic design truck has been used on more than 15,000 GM domestic



THREE PHOTOS COURTESY MAX EPHRAIM JR.



The A1A passenger truck (left) preceded the FT. Among the 1937 EMC crew were Blomberg (second from left), founder H.L. Hamilton (center), and, to his left, chief engineer Dick Dilworth.



TWO PHOTOS COURTESY MAX EPHRAIM JR.

North American locomotives since 1940 and, in addition, is widely used in Canada and some overseas countries. In spite of rapidly changing technology, this original "F" truck continues to be the standard for 4-axle GM locomotives with only minor variations from the original. Today's GP60's and kin are still produced with it, in either new or rebuilt form. There is little question that this truck design, first put into mass production in 1946, will still be in widespread operation in the 21st century—an outstanding record of achievement in railroad annals.

Doing things his way

What kind of man was Martin Blomberg, to whom this record of design longevity rightfully belongs? The strong competitive spirit he exhibited in Sweden, and the challenge of a new life in North America, helped develop a man of tremendous personal fortitude and unwavering objectivity. He designed the truck with a minimum of assistance, for there were no others at EMC acquainted with truck design. Strain gauges were crude, and finite element analysis was decades away. The designer himself had to rely on fairly simple calculations and a strong sense of mechanical aptitude, with perhaps a little luck added.

One of the men who co-authored a book with Blomberg called him a "Prussian"—a very difficult man to work with on a cooperative venture. Blomberg was not a team member; he was the boss. He would brook no compromise and in most cases was not open to suggestions. He could be very courteous, but his standard answer, if one approached his "territorial waters" with a suggestion, was, "Ve do it my way."

Blomberg's interests extended beyond



GM's new trucks debuted beneath the FT of 1939. After the war, Blomberg saw his F truck produced en masse.

truck design, and his contributions to draft gears are noteworthy. He had the idea of using rubber draft gears with a wedge principle, wherein the rubber was in both compression and shear. This design was applied to thousands of locomotives.

He designed the rubber "donut" for the thrust bearing in the axle journal bearings, still widely used today. He was also involved in the early days of locomotive mass production at EMD's La Grange (Ill.) plant, working closely with the manufacturing department in establishing the ground rules for the assembly line.

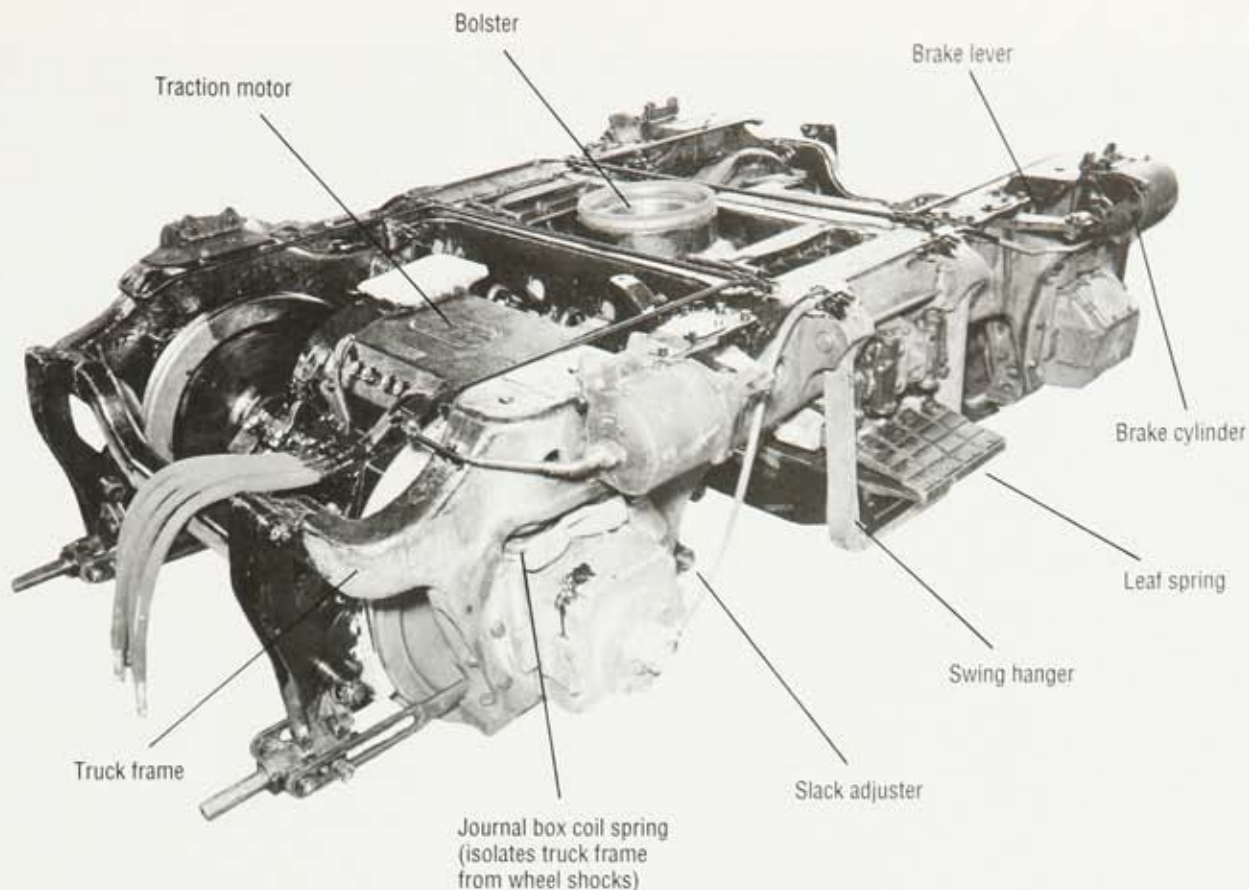
Passenger and freight diesels from EMD bore his handprints in almost every structural area, from the carbody to the "overhead" draft gears and the m.u. ramps. He was granted more than 100 patents during his lifetime, 32 during his 14 years at Electro-Motive.

Blomberg's truck design has been able to withstand the far greater demands imposed by today's locomotives with their higher horsepower and increased tractive effort. It has been said that he was not as cost-conscious as he should have been, that his designs were heavier than necessary, and that he would not listen to others. Many people would gladly plead guilty to such criticisms if their designs could be as successful as Blomberg's.

Always a role model

A little-known side of Martin Blomberg was his active interest in training young people. At EMD, young men who worked under him were outspoken in their praise of him, and of the great influence he was in their lives. One said he "idolized him." In Hinsdale, he was active in Boy Scouts and canoeing, and he taught rifle and pistol shooting.

In 1947, Blomberg was promoted to staff engineer, reporting to the chief engineer. He retired from this position on June 1, 1949, at age 61. He built a cabin on Seagull Lake in the "arrowhead" country of northeastern Minnesota. He enjoyed this remote area in summer, and spent winters in Florida. In 1957, at age 69, he took his son on a memorable canoe trip through the Ontario wilderness he had first visited in 1916. He found a booming mining company with huge equipment at the site where he had found high-grade gold ore almost 40 years earlier. Later,



The Blomberg truck: flexibility and a good ride

THE "BLOMBERG TRUCK" was the first fully flexible truck designed for heavy-duty freight locomotives. Prior to the introduction of the FT in late 1939, there were no freight diesels designed for heavy-duty, high-speed service. Since there were no such diesels, the "rigid" trucks—those with limited lateral motion—that had been employed on yard and switcher locomotives sufficed for what road freight duty the early diesels saw. Such rigid trucks are still available today for non-road units.

Passenger comfort was always considered paramount, and flexible trucks having lateral motion capabilities have been used for decades on passenger cars. The steam locomotives for passenger trains had many different truck designs, but all were rough-riding. With the advent of the lightweight, high-speed Streamliners in the 1930's, it was timely to provide a greatly improved locomotive ride. Martin Blomberg, while still employed by Pullman, was instrumental in developing the well-

known A1A truck which provided the best locomotive ride up to that time.

With the FT, it was necessary to provide a two-axle truck for freight units capable of handling higher traction horsepower, higher axle loadings, and higher operating speeds than previously necessary. Since Martin Blomberg was a strong proponent of the outside swing-hanger design, it followed that his new truck would meet all the design criteria, and at the same time employ outside swing hangers to provide a greatly improved cab ride while reducing track forces.

The FT's success was attributed to many factors, and old-time locomotive engineers will attest that a vastly improved ride was one of its best features. The conservative design factors utilized by Martin Blomberg enable his basic truck design to continue to be adequate for today's more demanding service a half century later.—Max Ephraim Jr.

Martin moved from Minnesota to Spruce Pine, N.C., and in 1966, he died at his home in Winter Park, Fla., at age 78.

Martin Blomberg had a true pioneering spirit, daring to strike into new territory, be it the wilds of North America or a new locomotive truck. Whatever he undertook—whether in competitive sports, training programs for young people, outdoor activities, or designing locomotive components—he

poured his energies out uncompromisingly to do his best. Recently, some outstanding engineers were described by the publication "American Heritage of Invention & Technology" as bold, self-reliant, independent, secure, powerful, daring, resolute, and, sometimes, arrogant and overbearing. I would propose to add Martin Blomberg's name to these, as he met all the criteria. He is a man to whom honor is due. **I**

MAX EPHRAIM JR., of Evergreen Park, Ill., retired from EMD as Chief Engineer in November 1983 after 44½ years of service. An Illinois Institute of Technology graduate and Navy veteran, he married Audrey Nelson in 1941; they raised six sons and three daughters. Max has authored many technical papers and has been honored by the American Society of Mechanical Engineers. He has several patents on diesel engines and locomotive components.